

ABSTRACT NO. 1

**IN VIVO BRAIN IMAGING BY A NITRIC OXIDE-BOUND IRON COMPLEX  
WITH N-(DITHIOCARBOXY)SARCOSINE IN THE RAT**

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We developed an *in vivo* electron spin resonance (ESR) imaging system which made it possible to visualize distributions of free radicals. A detecting agent of a nitric oxide radical (NO), iron complex with N-(dithiocarboxy)sarcosine, has been also developed. Using the system and the agent, we succeeded in imaging endogenous NO in the liver of lipopolysaccharide-treated mice. For the first step in applying this technique to the brain science, it is necessary to image the brain with exogenous NO. In this study, we tried to image the brain of a rat which received the NO-bound iron complex with N-(dithiocarboxy)sarcosine (Fe-DTCS-NO). We performed ESR imaging of intraperitoneally injected Fe-DTCS-NO in a rat's head. However, the space occupied by the brain was imaged as a low intensity area while the blood vessels and/or extracranial tissues as high intensity areas, indicating that Fe-DTCS-NO rarely passes through the blood-brain barrier. To overcome this problem, Fe-DTCS-NO was perfused into the rat striatum by microdialysis and ESR imaging was made. As a result, we obtained ESR-CT images of the rat brain, which showed that Fe-DTCS-NO have been distributed in the subcortical areas. The present study is considered to be an essential step for the subsequent *in vivo* ESR imaging of endogenous NO in the brain.